CLAIMS:

1 A shock absorber assembly including:

a motion damping means that is filled with a fluid in operation and has a pair of relatively moveable parts and valve means permitting flow of said fluid between said parts, said parts comprising a first part and a second part in which the first part is receivable whereby the parts are arranged for relative retracting and extending movement during which fluid is forced through said valve means at respective predetermined controlled flow rates so as to dampen said movement;

wherein said relatively moveable parts contain respective primary chambers for said fluid and said first part is substantially smaller in cross-section than said second part to define an intermediate chamber about the first part within the second part;

and wherein there is further included lateral port means communicating said intermediate chamber and said primary chamber of the first part;

and wherein said flows at respective predetermined controlled flow rates are limited to respective flows (i) directly from the primary chamber of the first part to the primary chamber of the second part and (ii) via said intermediate chamber and lateral port means from the primary chamber of the second part to the primary chamber of the first part.

2 A shock absorber assembly according to claim 1 wherein said first and second parts comprise telescopically interengaged tubes respectively of relatively smaller and larger diameter.

3 A shock absorber assembly according to claim 2 wherein said valve means is provided in a valve body fixed at an inner end of the tube comprising said first part.

4 A shock absorber assembly according to claim 2 or 3 wherein said lateral port means comprises a plurality of spaced individual ports in said tube comprising said first part.

5 A shock absorber assembly according to claim 2, 3 or 4 wherein said lateral port means is positioned whereby, during said extending movement, the lateral port means is covered near the end of the movement, whereby fluid in said intermediate chamber cushions further extending movement.

6 A shock absorber assembly according to any preceding claim including respective shim packs in part determining said respective predetermined controlled flow rates and further determining the respective directions of flow.

7 A shock absorber assembly according to any preceding claim, further including pressurised-gas cushioning means including structure defining a first cavity for storing a pressurised gas and a second cavity for storing a fluid under pressure, and a floating piston sealingly separating said cavities, wherein said second cavity is in fluid flow communication with said motion damping means.

8 A shock absorber assembly according to claim 7, wherein said movement is such that when said parts relatively extend, fluid is caused to flow from said second cavity of the pressurised-gas cushioning means to the damping means whereby gas pressure in said first cavity moves the floating piston to reduce the gas pressure in the first cavity, and when said parts relatively retract, fluid is caused to flow from the damping means to said second cavity whereby to move the floating piston to increase the gas pressure of the gas in the first cavity.

9 A shock absorber assembly according to claim 7 or 8 wherein said first part of the motion damping means and said structure of the pressurised-gas cushioning means are integral whereby said second cavity and said primary chamber of the first part comprise a single chamber.

10 A shock absorber assembly according to claim 9, wherein said first part of the motion damping means and said structure of the pressurised-gas cushioning means are provided by a single tube.

11 A shock absorber assembly according to claim 7 or 8 wherein said pressurised-gas cushioning means and said motion damping means are substantially separate units and a conduit is provided for said fluid flow communication between the motion damping means and said second cavity.

12 A shock absorber assembly according to claim 11 wherein said conduit is between the primary chamber of the first part of the motion damping means and said second cavity.

13 A shock absorber assembly according to claim 11 wherein said conduit is between the primary chamber of the second part of the motion damping means and said second cavity.

14 A shock absorber assembly according to any one of claims 1 to 13 wherein the valve means is such that said respective predetermined controlled flow rates in the respective directions are different whereby to vary the damping characteristics according to whether said movement is relative retracting or extending movement.

15 A shock absorber assembly according to any one of claims 1 to 14 further including cooling means for reducing the temperature of the assembly during operation.